Image 1 of 1

TRANSMITTAL OF APPEAL BRIEF (Small Entity)

Docket No. **POM-12102/29**

OIPE JC42 NOV 28 2003 PATENT & TRADEMARK OFFICE

In Re Application Of: **Skszek et al**

Serial No.	Filing Date	Examiner	Group Art Unit
09/851,601	**May 9, 2001**	**E. Fuller**	**1762**

Invention: **FABRICATION OF ALLOY VARIANT STRUCTURES USING DIRECT METAL DEPOSITION**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on: **September 24, 2003**

Applicant is a small entity under 37 CFR 1.9 and 1.27.

A verified statement of small entity status under 37 CFR 1.27:

- ☐ is enclosed.
- ☐ has already been filed in this application.

The fee for filing this Appeal Brief is: **$165.00**

- ☒ A check in the amount of the fee is enclosed.
- ☐ The Director has already been authorized to charge fees in this application to a Deposit Account.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **07-1180**

Signature

Dated: **Nov. 24, 2003**

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I certify that this document and fee is being deposited on 11-24-03 with the U.S. Postal Service as first class mail under 37 C.F.R. 1.8 and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Signature of Person Mailing Correspondence

Sheryl L. Hammer

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NOV 28 2003
TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Skszek et al

Serial No.: 09/851,601 Group No.: 1762

Filed: May 9, 2001 Examiner: E. Fuller

For: FABRICATION OF ALLOY VARIANT STRUCTURES USING DIRECT METAL DEPOSITION

APPELLANTS' BRIEF UNDER 37 CFR §1.192

Mail Stop Appeal Brief
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I. Real Party in Interest

The real party and interest in this case is Timothy Skszek, Mathew Lowney and Dwight Morgan, Applicants and Appellants.

II. Related Appeals and Interferences

There are no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

The present application was filed with 5 claims. Claims 6-10 were added in January 2003. Claims 6-10 were withdrawn from consideration by the Examiner in March 2003. Claims 1-5 are under appeal.

IV. Status of Amendments Filed Subsequent Final Rejection

No after-final amendments have been filed.

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V. Concise Summary of the Invention

The present invention overcomes shortcomings in the prior art through the use of direct-metal deposition (DMD) [tm] to fabricate alloy-variant material structures which provide a combination of desirable physical and mechanical properties. In particular, use of the invention facilitates the production of high-strength, high-wear, and impact-resistant structures which decrease the likelihood of erosion, heat checking and brittle failure (Specification, page 5, lines 12-16).

Fabrication of die or mold components using the closed-loop DMD process and alloy variant materials may be used to tailor material requirements in various applications, including injection molds, die casting, thixomolding and other, more exotic tooling (Specification, page 5, lines 17-20). Fabrication of die or mold components using the closed-loop DMD process and alloy variant materials, may be used address the local application requirements, including die component/insert configurations (Specification, page 5, line 20 to page 6, line 2).

In the preferred embodiment, the invention uses DMD to deposit a first material or alloy in an area exposed to high wear, such as the tooling gate area, with a second material or alloy being used elsewhere in the tool for greater impact resistance (Specification, page 6, lines 3-5). Advantageously, the areas may be of a user-defined thickness to further improve longevity. The resulting composite material structure has mechanical properties (i.e., yield strength, hardness and abrasion resistance) which exceed that of the homogeneous compositions currently used for mold materials, thereby enhancing productivity while improving part quality in these and other applications (Specification, page 6, lines 6-10).

VI. Concise Statement of Issues Presented For Review

1. Are claims 1 and 2 unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al.?

2. Is claim 1 unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., or vice versa?

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3. Are claims 3 and 4 unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al.?

4. Are claims 3 and 4 unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., or vice versa, as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al.?

5. Is claim 5 unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. as applied to claim 3, in view of Thompson (Handbook)?

6. Is claim 5 unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., or vice versa, as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. as applied to claim 3, in view of Thompson (Handbook)?

7. Is claim 1 obvious due to double patenting over claim 20 of the '564 patent to Koch in view of Kar?

VII. Grouping of Claims for Each Ground of Rejection Which Appellants Contend

Appellants believe the following groups of claims represent patentably distinct inventions which should be given independent consideration on appeal:

Group I: Claims 1-2, wherein claim 2 stands or falls with claim 1;

Group II: Claim 3-4, wherein claim 4 stands or falls with claim 3; and

Group III: Claim 5.

VIII. Argument

A. Important Note on Procedure

Although this application at one time had 10 pending claims, claims 6-10 were withdrawn from consideration by the Examiner in March, 2003. Appellants filed a petition to have claims 6-10 examined on the grounds that claims 6 to 10 are product-by-process claims making direct reference to

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method claims 1-5, respectively. It appears, however, that Appellants' petition never made it to the petitions branch, since further "justification" for the restriction was subsequently received from the Examiner. Since Appellants paid a fee along with the petition, Appellants would like the Board's opinion on the propriety of Office's handling of the petition and fee.

B. Group I - Claims 1-2, wherein claim 2 stands or falls with claim 1

Claim 1 stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., *or vice versa.*

According to Jeantette, a method and system are provided for producing complex, three-dimensional, net-shape objects from a variety of powdered materials. The system includes various components to ensure a uniform and continuous flow of powdered materials and to focus and locate the flow of powdered materials with respect to a laser beam which results in the melting of the powdered material. The system also includes a controller so that the flow of molten powdered materials can map out and form complex, three-dimensional, net-shape objects by layering the molten powdered material. Advantageously, such complex, three-dimensional net-shape objects can be produced having material densities varying from 90 percentage of theoretical to fully dense, as well as a variety of controlled physical properties. Additionally, such complex, three-dimensional objects can be produced from two or more different materials so that the composition of the object can be transitioned from one material to another.

Claim 1 includes, *inter alia*, the limitations of a feedback-controlled laser-assisted direct metal deposition process wherein the feeding of material into a melt pool creates a deposit with a physical dimension, and wherein this physical dimension is optically monitored. The Examiner states that Jeantette teaches "that the article of optically monitored for feedback," citing column 8, lines 28-40. However, the "feedback" system of Jeantette et al. is very different from that of Appellants, in that rather than monitoring the dimension of a deposit, a triangulation system is used *to estimate* layer thickness as a function of the energy input to a particular location. "Experimental data suggests that the deposition layer thickness increases nearly linearly with increasing volumetric exposure." The triangulation device is mounted such that an output signal is generated that is proportional to the height of the forming structure. "This will typically correspond to the position where the deposition beam B is

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at short focus on the deposition stage S." (See column 9, lines 2-5). Thus, Jeantette does not teach the limitations of optically monitoring the physical dimension, and automatically controlling the physical dimension in accordance with the description of an article to be fabricated. Thus, even with the addition of the Kar reference, as discussed below, the Jeantette/Kar combination fails to teach all the elements of claim 1.

Kar resides in a "one-step" rapid manufacturing process to create prototyping parts (see Abstract). Although a laser and feed material are used, there is absolutely no teaching or suggestion of feedback of any kind, optical or otherwise. That is, in clear distinction to Appellants' claimed process, the system and method of Kar et al. clearly function in an "open-loop" mode only. The Examiner concedes that Kar fails to teach the formation of a "melt pool," but contends that it would be obvious to form a melt pool "to achieve results "similar" to those of Jeantette. Appellants argue that this conclusion fails to establish *prima facie* obviousness. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). In this case, the process of Kar is adequately disclosed and the lack of a melt pool is technically justified. Thus, combining these references would change the principle of operation of the prior art invention being modified, thereby defeating *prima facie* obviousness.

Claim 1 further stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. Koch describes how laser-mediated cladding may be used to accumulate the build-up of material on a substrate. A laser is used to locally heat a spot on a substrate, forming a melt pool into which material, preferably in powder form, is fed so as to create a deposit having a physical dimension. Optical detection means coupled to an optoelectric sensor are used to monitor a physical dimension of the deposit, and a feedback controller is operative to adjust the laser in accordance with the electrical signal, thereby controlling the rate of material deposition. In the preferred embodiment, the physical dimension is the height of the deposit, and the system further includes an interface to a computer-aided design (CAD) system including a description of an article to be fabricated, enabling the feedback controller to compare the physical dimension of the deposit to the description and adjust the energy of the laser in accordance therewith.

The Examiner argues that combining Koch and Kar would be obvious "since Koch teaches the

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modification and Kar teaches the modification is desired in the art. Appellants contend that this is insufficient. In rejecting claims under 35 U.S.C. §103, the Examiner must provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art, or to combine references, to arrive at Appellants' claimed invention. There must be something *in the prior art* that suggests the proposed modification, other than the hindsight gained from knowledge that the inventor choose to combine these particular things in this particular way. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988). The Examiner is also required to make specific findings on a suggestion to combine prior art references. In Re Dembeczak, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999). In this case, apart from the fact that combining Koch and Kar would alter Kar's basis of operation, there is no teaching or suggestion *from the prior art* to combine these references.

C. Group II - Claim 3-4, wherein claim 4 stands or falls with claim 3

Claim 3 stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. Claim 3 further stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., or vice versa, as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. Appellants contend that Singer adds nothing to the Examiner's argument that the claims of this group are *prima facie* obvious. As the Examiner points outs, Singer teaches a tool used for high-pressure die casting, and fails to disclose the method of Koch, Jeantette or Kar in terms of fabrication. In fact, the technique described by Singer resides in the deposition of a single steel layer (3) followed by a single copper layer (4) on a die or mold surface using a spray molten metal technique. Alternatively, Singer proposes metal spray deposition of alternating copper and tool steel materials followed by machining (drilling) of the cooling channels in the fabricated structure. As such, *alloying*, as well would be understood of any one of skill in the art, is simply not taught.

In this instance as well, there is no teaching or suggestion whatsoever in Singer et al. to use the processes of Koch, Jeantette or Kar, and, in fact, there *is* disclosure regarding processes *other than that disclosed by these other references*. Furthermore, even if Singer were combined with the cited

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references, Appellants' claimed process would not result, given Singer's prescribed metal spray deposition of alternating copper and tool steel materials followed by machining (drilling) of the cooling channels in the fabricated structure. Given that there is no teaching or suggestion *from the prior art* to support the combination of references advanced by the Examiner, *prima facie* obviousness cannot be established.

D. Group III - Claim 5

Claim 5 stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. as applied to claim 3, and further in view of Thompson (Handbook). Claim 5 also stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., or vice versa, as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. as applied to claim 3, and further in view of Thompson (Handbook).

Claim 5 *adds to claim 1* that the tooling produced according to the method is a die-cast mold having a gate area, with H19 steel being used in conjunction with the fabrication of the gate area and H13 steel being used in conjunction with the fabrication of non-gate areas. As with certain of the other rejections referenced above, Appellants are *not claiming* the use of H13 or H19 steel. Appellants are well aware that these types of steels exist, and is using a novel feedback-controlled laser assisted direct metal deposition (DMD™) process to fabricate the gate and non-gate areas. Without a teaching or suggestion *from the prior art* to carry out these steps, *prima facie* obviousness cannot be established, despite the information found in the Thompson Handbook.

E. Claim 1 is not obvious due to double patenting over claim 20 of the '564 patent to Koch in view of Kar

Claim 1 is not obvious due to double patenting over claim 20 of the '564 patent to Koch in view of Kar based upon the same rationale that Koch and Kar should not be combined in the first place. Whereas Koch teaches the formation of a "melt pool," Kar discloses a different process that would be modified through the combination of references. Additionally, apart from the fact that combining Koch

and Kar would alter Kar's basis of operation, there is no teaching or suggestion *from the prior art* to combine these references.

Conclusion

In conclusion, for the arguments of record and the reasons set forth above, all pending claims of the subject application continue to be in condition for allowance and Appellants seek the Board's concurrence at this time.

Respectfully submitted,

By: _____

Date: Nov. 24, 2003

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APPENDIX A

CLAIMS ON APPEAL

1. (Amended) An improved tooling fabrication method, comprising the steps of:

depositing a first metallic or ceramic alloy using a feedback-controlled laser-assisted direct metal deposition process in a first region of the tooling requiring high thermal or wear resistance;

depositing a second metallic or ceramic alloy using the feedback-controlled laser-assisted direct metal deposition process in a second region of the tooling requiring high strength or impact resistance; and

wherein the feedback-controlled laser-assisted direct metal deposition process further includes the steps of:

providing a description of the tooling to be fabricated,

heating the first and second regions of the tooling with a laser sufficient to form a localized meltpool,

feeding material into the melt pool such that the metallic or ceramic alloy being deposited has a physical dimension,

optically monitoring the physical dimension, and

automatically controlling the physical dimension metallic or ceramic alloy being deposited in accordance with the description of the article to be fabricated.

2. The method of claim 1, wherein the tooling is used in injection molding, die casting, or thixomolding.

3. The method of claim 1, wherein:

the tooling includes a gate area; and

the first metallic or ceramic alloy is deposited relative to the gate area.

4. (Amended) The method of claim 1, wherein:

the tooling opens and closes at an interface; and

the second metallic or ceramic alloy is deposited relative to the interface.

5. The method of claim 1, wherein:

the tooling is die-cast mold having a gate area;

H19 steel is used in conjunction with the fabrication of the gate area; and

H13 steel is used in conjunction with the fabrication of non-gate areas.

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V. Concise Summary of the Invention

The present invention overcomes shortcomings in the prior art through the use of direct-metal deposition (DMD) [tm] to fabricate alloy-variant material structures which provide a combination of desirable physical and mechanical properties. In particular, use of the invention facilitates the production of high-strength, high-wear, and impact-resistant structures which decrease the likelihood of erosion, heat checking and brittle failure (Specification, page 5, lines 12-16).

Fabrication of die or mold components using the closed-loop DMD process and alloy variant materials may be used to tailor material requirements in various applications, including injection molds, die casting, thixomolding and other, more exotic tooling (Specification, page 5, lines 17-20). Fabrication of die or mold components using the closed-loop DMD process and alloy variant materials, may be used address the local application requirements, including die component/insert configurations (Specification, page 5, line 20 to page 6, line 2).

In the preferred embodiment, the invention uses DMD to deposit a first material or alloy in an area exposed to high wear, such as the tooling gate area, with a second material or alloy being used elsewhere in the tool for greater impact resistance (Specification, page 6, lines 3-5). Advantageously, the areas may be of a user-defined thickness to further improve longevity. The resulting composite material structure has mechanical properties (i.e., yield strength, hardness and abrasion resistance) which exceed that of the homogeneous compositions currently used for mold materials, thereby enhancing productivity while improving part quality in these and other applications (Specification, page 6, lines 6-10).

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method claims 1-5, respectively. It appears, however, that Appellants' petition never made it to the petitions branch, since further "justification" for the restriction was subsequently received from the Examiner. Since Appellants paid a fee along with the petition, Appellants would like the Board's opinion on the propriety of Office's handling of the petition and fee.

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at short focus on the deposition stage S." (See column 9, lines 2-5). Thus, Jeantette does not teach the limitations of optically monitoring the physical dimension, and automatically controlling the physical dimension in accordance with the description of an article to be fabricated. Thus, even with the addition of the Kar reference, as discussed below, the Jeantette/Kar combination fails to teach all the elements of claim 1.

Kar resides in a "one-step" rapid manufacturing process to create prototyping parts (see Abstract). Although a laser and feed material are used, there is absolutely no teaching or suggestion of feedback of any kind, optical or otherwise. That is, in clear distinction to Appellants' claimed process, the system and method of Kar et al. clearly function in an "open-loop" mode only. The Examiner concedes that Kar fails to teach the formation of a "melt pool," but contends that it would be obvious to form a melt pool "to achieve results "similar" to those of Jeantette. Appellants argue that this conclusion fails to establish *prima facie* obviousness. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). In this case, the process of Kar is adequately disclosed and the lack of a melt pool is technically justified. Thus, combining these references would change the principle of operation of the prior art invention being modified, thereby defeating *prima facie* obviousness.

Claim 1 further stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. Koch describes how laser-mediated cladding may be used to accumulate the build-up of material on a substrate. A laser is used to locally heat a spot on a substrate, forming a melt pool into which material, preferably in powder form, is fed so as to create a deposit having a physical dimension. Optical detection means coupled to an optoelectric sensor are used to monitor a physical dimension of the deposit, and a feedback controller is operative to adjust the laser in accordance with the electrical signal, thereby controlling the rate of material deposition. In the preferred embodiment, the physical dimension is the height of the deposit, and the system further includes an interface to a computer-aided design (CAD) system including a description of an article to be fabricated, enabling the feedback controller to compare the physical dimension of the deposit to the description and adjust the energy of the laser in accordance therewith.

The Examiner argues that combining Koch and Kar would be obvious "since Koch teaches the

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modification and Kar teaches the modification is desired in the art. Appellants contend that this is insufficient. In rejecting claims under 35 U.S.C. §103, the Examiner must provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art, or to combine references, to arrive at Appellants' claimed invention. There must be something *in the prior art* that suggests the proposed modification, other than the hindsight gained from knowledge that the inventor choose to combine these particular things in this particular way. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988). The Examiner is also required to make specific findings on a suggestion to combine prior art references. In Re Dembeczak, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999). In this case, apart from the fact that combining Koch and Kar would alter Kar's basis of operation, there is no teaching or suggestion *from the prior art* to combine these references.

C. Group II - Claim 3-4, wherein claim 4 stands or falls with claim 3

Claim 3 stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. Claim 3 further stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., or vice versa, as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. Appellants contend that Singer adds nothing to the Examiner's argument that the claims of this group are *prima facie* obvious. As the Examiner points outs, Singer teaches a tool used for high-pressure die casting, and fails to disclose the method of Koch, Jeantette or Kar in terms of fabrication. In fact, the technique described by Singer resides in the deposition of a single steel layer (3) followed by a single copper layer (4) on a die or mold surface using a spray molten metal technique. Alternatively, Singer proposes metal spray deposition of alternating copper and tool steel materials followed by machining (drilling) of the cooling channels in the fabricated structure. As such, *alloying*, as well would be understood of any one of skill in the art, is simply not taught.

In this instance as well, there is no teaching or suggestion whatsoever in Singer et al. to use the processes of Koch, Jeantette or Kar, and, in fact, there *is* disclosure regarding processes *other than that disclosed by these other references*. Furthermore, even if Singer were combined with the cited

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references, Appellants' claimed process would not result, given Singer's prescribed metal spray deposition of alternating copper and tool steel materials followed by machining (drilling) of the cooling channels in the fabricated structure. Given that there is no teaching or suggestion *from the prior art* to support the combination of references advanced by the Examiner, *prima facie* obviousness cannot be established.

D. Group III - Claim 5

Claim 5 stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,122,564 to Koch et al. in view of U.S. Patent No. 6,203,861 to Kar et al. as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. as applied to claim 3, and further in view of Thompson (Handbook). Claim 5 also stands rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,046,426 to Jeanette [sic] in view of U.S. Patent No. 6,203,861 to Kar et al., or vice versa, as applied to claim 1, and further in view of U.S. Patent No. 5,875,830 to Singer et al. as applied to claim 3, and further in view of Thompson (Handbook).

Claim 5 *adds to claim 1* that the tooling produced according to the method is a die-cast mold having a gate area, with H19 steel being used in conjunction with the fabrication of the gate area and H13 steel being used in conjunction with the fabrication of non-gate areas. As with certain of the other rejections referenced above, Appellants are *not claiming* the use of H13 or H19 steel. Appellants are well aware that these types of steels exist, and is using a novel feedback-controlled laser assisted direct metal deposition (DMD™) process to fabricate the gate and non-gate areas. Without a teaching or suggestion *from the prior art* to carry out these steps, *prima facie* obviousness cannot be established, despite the information found in the Thompson Handbook.

E. Claim 1 is not obvious due to double patenting over claim 20 of the '564 patent to Koch in view of Kar

Claim 1 is not obvious due to double patenting over claim 20 of the '564 patent to Koch in view of Kar based upon the same rationale that Koch and Kar should not be combined in the first place. Whereas Koch teaches the formation of a "melt pool," Kar discloses a different process that would be modified through the combination of references. Additionally, apart from the fact that combining Koch

and Kar would alter Kar's basis of operation, there is no teaching or suggestion *from the prior art* to combine these references.

Conclusion

In conclusion, for the arguments of record and the reasons set forth above, all pending claims of the subject application continue to be in condition for allowance and Appellants seek the Board's concurrence at this time.

Respectfully submitted,

By: _____

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APPENDIX A

CLAIMS ON APPEAL

1. (Amended) An improved tooling fabrication method, comprising the steps of:

depositing a first metallic or ceramic alloy using a feedback-controlled laser-assisted direct metal deposition process in a first region of the tooling requiring high thermal or wear resistance;

depositing a second metallic or ceramic alloy using the feedback-controlled laser-assisted direct metal deposition process in a second region of the tooling requiring high strength or impact resistance; and

wherein the feedback-controlled laser-assisted direct metal deposition process further includes the steps of:

providing a description of the tooling to be fabricated,

heating the first and second regions of the tooling with a laser sufficient to form a localized meltpool,

feeding material into the melt pool such that the metallic or ceramic alloy being deposited has a physical dimension,

optically monitoring the physical dimension, and

automatically controlling the physical dimension metallic or ceramic alloy being deposited in accordance with the description of the article to be fabricated.

2. The method of claim 1, wherein the tooling is used in injection molding, die casting, or thixomolding.

3. The method of claim 1, wherein:

the tooling includes a gate area; and

the first metallic or ceramic alloy is deposited relative to the gate area.

4. (Amended) The method of claim 1, wherein:

the tooling opens and closes at an interface; and

the second metallic or ceramic alloy is deposited relative to the interface.

5. The method of claim 1, wherein:

the tooling is die-cast mold having a gate area;

H19 steel is used in conjunction with the fabrication of the gate area; and

H13 steel is used in conjunction with the fabrication of non-gate areas.

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